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inline control

# Biotechnology
# Bioprocess Control

## pH
## Conductivity

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# pH / Conductivity

The **CONTROL 200** series of electrochemical analyzers integrates the latest advances in technology providing high performance measurements for a diverse range of bio-process monitoring and control applications. From fermentation to purification, flexible and powerful CONTROL 200 analyzers offer reliable measurement solutions for pH and conductivity.

Space-saving single and dual-sensor versions are commonly configured with pH and conductivity sensors installed before and after the chromatography column for protein separation and purification operation.

***Compact but packed with functionality,*** *CONTROL 200 analyzers occupy less panel space than other electrochemical analyzers. With the ability to multiplex two sensors to one converter, dual-sensor versions perform continuous measurements normally accomplished by two separate analyzers.*

When coupled with high quality sensors installed in optek's unique inline sensor bodies, Control 200 electrochemical analyzers deliver real-time measurements with exceptional accuracy, reliability and performance.

**pH and conductivity in one inline sensor body**
Unique ultra-sanitary design with low flow restriction and hold-up volume.

**optek Inline Sensor Bodies**
The internal geometries of optek inline sensor bodies are optimized to ensure unrestricted flow of all process fluids. This unique design results in low hold-up volumes and fast sensor response improving measurement accuracy and performance. Due to their modular design and a wide selection of line sizes and process connections, optek inline sensor bodies are ideal when integrating high performance instrumentation for a broad range of bioprocess applications.

All optek inline bodies and sensors are constructed with certified materials that conform to FDA guidelines. Wetted materials are specified for superior performance and resistance to solutions commonly used in bioprocess operations like acids, bases as well as organic and inorganic solvents.

**From laboratory and pilot operations to large scale manufacturing processes, optek provides innovative, robust and reliable measurement solutions for a wide range of bioprocess applications.**


***Qualified, certified and documented:***
***ISO 9001, PED, ATEX, FM, FDA, CE...***

## *Converter CONTROL 200*
*Electrochemical Converter*

The CONTROL 200 is a versatile and reliable converter for high performance electrochemical measurements. Because CONTROL 200 has the ability to accept a variety of RTDs like 3K ohm Balco, Pt100 and Pt1000, manual or automatic temperature compensation required for accurate pH and conductivity measurements is easily accomplished. Configuration and calibration is simplified using integrated buffer, concentration and temperature compensation tables imbedded in the CONTROL 200 firmware. Dual input versions incorporate a real time clock and datalogger that stores entries for alarm events, sensor errors, power failures and sensor calibrations.

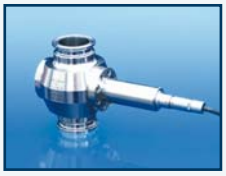

The sensors PF12 and CF60 are designed to provide a precise and reliable control of pH and conductivity directly in the process at very low volumes.
The sensors can be installed in optek biotech measuring cells either separately or together. Due to the proven design, the sensors are compatible with CIP/SIP, meet sterility requirements and still allow maximum flexibility in the adaption to the process. Both sensors can be manufactured with special wetted materials starting from linesize DN6 (1/4”).
Unique 12 ° orientation provides improved pH electrode performance and longevity.

- Single and dual input configurations multiplex two sensors to one converter
- Compact design - 96 x 96 x 162 mm flexibility with reduced panel space
- Versatility - designed to interface with many high quality sensors offered by popular manufacturers
- Up to four analog outputs from one converter: pH, conductivity and temperature
- Patented six-electrode design provides superior measurement performance
- Wide measuring range with high accuracy - 1 µS/cm to 850 mS/cm
- Integrated fast response temperature sensor Pt1000
- Solution ground offers the ability to perform pH sensor diagnostics inline
- Use your preferred pH electrodes - the PF12 accepts a wide variety of Ø12 mm sensors
- Manufactured with traceable and certified materials conforming to FDA guidelines
- optek inline sensor bodies have optimized flow characteristics and low hold-up volume

## *PF12 Electrode Adapter*
*Inline pH Measurement*

The PF12 electrode adapter allows the installation of a wide variety of pH electrodes inline.
Its unique 12 ° angled design ideally positions the pH electrode in the process stream keeping electrolyte at the tip.

This innovative design has been proven to improve the performance, useable lifetime and contamination resistance of the pH electrode. The PF12 is equipped with a solution ground connection that eliminates ground loop problems and provides the ability to perform real-time electrode diagnostics such as low glass impedance, sensor failure and empty pipe or broken cable detection.



## *CF60 Six-electrode Conductivity*
*Superior Performance Inline*

The CF60 six-electrode conductivity sensor has optimal positioning of four current electrodes around two potential electrodes providing a consistent and symmetrical excitation field. This patented design offers impressive precision and performance over an extremely wide measuring range and guarantees minimized sensitivity to sensor fouling and polarization.
Additionally, the Pt1000 RTD integrated in the tip of the CF60 sensor provides responsive temperature compensation.

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# Confidence and Reliability

| CONTROL 200 | | | | | |
|---|---|---|---|---|---|
| **Dimensions:** | 96 X 96 X 162 mm (3.78 X 3.78 X 6.38 in.) | | | | |
| **Display:** | Backlit LC display (dual 5-digits, 7-segments) | | | | |
| **Logbook:** | Record of process events and calibration | | | | |
| **Power Supply:** | 85 to 265 V AC 50/60 Hz | | | | |
| **Optional:** | 12 to 30 V DC | | | | |
| **Models:** | **C210** | **C220** | **C211** | **C221** | **C222** |
| Relay Outputs: | 3 | 3 | 5 | 5 | 5 |
| Analog Outputs: 0-10 mA, or 0/4-20 mA | 2 | 2 | 4 | 4 | 4 |
| **Possible Sensor Combinations:** | | | | | |
| 1 sensor PF12 (pH): | X | | X | X | |
| 1 sensor CF60 (conductivity): | | X | | X | X |
| 2 sensors PF12 + PF12 (dual pH): | | | X | | |
| 2 sensors PF12 + CF60 (pH + conduct.): | | | | X | |
| 2 sensors CF60 + CF60 (dual conduct.): | | | | | X |
| RTD (3K Ω Balco, Pt100, Pt1000): | X | X | X | X | X |

**Other Innovative Products for Biotechnology:**

- Dual wavelength UV Analyzers for purification
- Inline UV-VIS photometers for membrane filtration
- Cell Density probes for fermentation and cell culture
- NIR Turbidimeters for separation control
- NIST-traceable filters for confident analyzer performance
- Inline bubble detectors for chromatography columns
- Concentration analyzers for tangential flow filtration

| PF12 pH Electrode Adapter | |
|---|---|
| **Materials:** | |
| Electrode Holder *: | 316L Stainless Steel (1.4435), BN2 |
| Type of Protection: | NEMA Type 4X, (IP 65) |
| **Wetted Parts:** | |
| Adapter Ring *: | 316L Stainless Steel (1.4435), BN2 |
| Surface Finish: | Electro-polished Ra < 0.8 µm |
| Electrode O-ring *: | EPDM (FDA), others 11.00 x 3.00 mm |
| Body O-ring Seal *: | EPDM (FDA), others 21.95 x 1.78 mm |
| **Process Specifications:** | |
| Solution Ground: | optek female SA483 for solution ground plug |
| Process Connection: | Designed for optek in-line sensor bodies |
| Process Temperature: | -10 °C (24 °F) to +135 °C (275 °F) |
| Max. Pressure: | PS 6 bar with TS -10° to 135 °C (24° to 275 °F) |
| **Electrodes Types:** | Suitable for wide variety of sterilizable electrodes |
| with dimensions: | Ø 12 x 120 mm, PG 13.5 thread |

| CF60 Contacting Conductivity Sensor | |
|---|---|
| **Materials:** | |
| Sensor Assembly: | 316L Stainless Steel (1.4435) |
| Type of Protection: | NEMA Type 4X, (IP 65) |
| **Wetted Parts:** | |
| Probe Body: | PEEK (FDA) |
| Electrodes *: | 316L Stainless Steel (1.4435), BN2 |
| Body O-ring Seal *: | EPDM (FDA), others 21.95 x 1.78 mm |
| **Process Specifications:** | |
| Measuring Range: | 1 µS/cm to 850 mS/cm |
| Temperature Sensor: | Integrated Pt1000 RTD (IEC class A) |
| Process Connection: | Designed for optek in-line sensor bodies |
| Process Temperature: | -10 °C (24 °F) to +135 °C (275 °F) |
| Max. Pressure: | PS 6 bar with TS -10 °C to 50 °C (24° to 122 °F) |
| **Cable Set with Quick Plug:** | |
| Lengths: | 5, 10, 15, 20, 25 or 30 m |
| | 16, 33, 49, 66, 82 or 98 ft. |

* Other materials on request


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